Economic Support Ratios and the First and Second Demographic Dividend in Europe

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Structure of the talk

1. National transfer accounts

2. Data and methodology
   - population projections
   - NTA methodology
   - NTA age profiles
   - support ratio
   - first and second demographic dividend

3. Results

4. Conclusion
“Over coming decades, changes in population age structure will have profound implications for the macroeconomy, influencing economic growth, generational equity, human capital, saving and investment, and the sustainability of public and private transfer systems. How the future unfolds will depend on key actors in the generational economy: governments, families, financial institutions, and others. This path-breaking book provides a comprehensive analysis of the macroeconomic effects of changes in population age structure across the globe.”
1. National Transfer Accounts
36 countries

Europe:

Austria
Finland
France
Germany
Hungary
Slovenia
Spain
Sweden
UK
Italy
Figure 1. Per-capita labor income and consumption by age in India (left) in 2004 and in Germany (right) in 2003. Source: Lee and Mason forthcoming, Figure 1.3.
Figure 2. Aggregate labor income and consumption by age in India (left) in 2004 and in Germany (right) in 2003. Source: Lee and Mason forthcoming, Figure 1.3.
„NTA documents means by which those age groups with life cycle deficits draw on surplus resources from persons in prime working ages.“
2. Data and methodology

a) Population projections
b) NTA Methodology
c) NTA age profiles of labour income, consumption and lifecycle deficit
d) Support ratio
e) The first and second demographic dividend
a) Population Projections

Age structure in European NTA countries 1960-2050 (actual data for 1960-2010 and projections for 2011-2060); in percentages
b) NTA methodology

flow account identity

Inflows
- \( Y_l(a) \) ...labor income
- \( Y^a(a) \) ...asset income
- \( \tau^+ (a) \) ...transfers received

Outflows
- \( C(a) \) ...consumption
- \( S(a) \) ...savings
- \( \tau (a) \) ...transfers paid

\[
\begin{align*}
Y_l^l(a) + Y^a(a) + \tau^+ (a) &= C(a) + S(a) + \tau^- (a) \\
C(a) - Y_l^l(a) &= Y^a(a) - S(a) + \tau^+ (a) - \tau^- (a)
\end{align*}
\]

(Source: Mason 2007)
Components of...

...consumption: education, health, others  
⇒ private vs. public

...income:  
asset income, labor income

...transfers:  
education, healthcare, pensions, illness, unemployment, family and children  
⇒ public vs. private

...assets:  
businesses, homes, etc.  
⇒ primarily through private institutions

“The mechanisms by which assets are shifted across age groups is important because it determines whether population ageing leads to accumulation of assets or to the expansion of public and private transfer programs.”

(Mason and Lee 2006)
Life cycle deficit can be financed through:

a) public transfers (health, pensions, unemployment, …)

b) private transfers (parents financing consumption of children)

c) asset reallocation (savings, interests on bonds, selling house)

These flows are mediated by public and private institutions.
General Rule: Equation Version

1. Estimate per capita age profile

\[ X^p(a) = \beta \bar{X}^p(a) N(a) \]

\[ \beta = \frac{X_{NIPA}^p}{\sum_a \bar{X}^p(a) N(a)} \]

2. Multiply by the population

3. Adjust to National Income and Product Account (NIPA) total.
c) NTA age profiles

Labour income age profile for European NTA countries; presented as labour income per capita relative to the average labour income in 30-49 age group.
c) NTA age profiles - continued

Consumption age profile for European NTA countries; as consumption per capita relative to the average labour income in the 30-49 age group
c) NTA age profiles - continued

Lifecycle deficit age profile for European NTA countries; as lifecycle deficit per capita relative to the average labour income in 30-49 age group

Negative LCD:
Germany: 31 years (age 27-57)
Slovenia: 31 years (age 25-55)
Sweden: 38 years (age 25–62)
Age-Distribution of Income, Consumption and Transfers in Austria 2005

- Labor Income
- Public Transfers
- Asset-based Reallocation
- Private Transfers
- Consumption
d) Support ratio

\[ LF1 = \sum_{a=20}^{64} N_a \]
\[ CON1 = \sum_{a=0}^{\omega} N_a \]
\[ LF2 = \sum_{a=0}^{\omega} \gamma(a) P(a,t) \]
\[ CON2 = \sum_{a=0}^{\omega} \alpha(a) P(a,t) \]

\[ SR1 = \frac{LF1}{CON1} \]
\[ SR2 = \frac{LF1}{CON2} \]
\[ SR3 = \frac{LF2}{CON1} \]
\[ SR4 = \frac{LF2}{CON2} \]

NTA support ratio
e) The First and Second Demographic Dividend

\[
\frac{C(t)}{N(t)} = \frac{C(t)}{Y(t)} \cdot \frac{Y(t)}{L(t)} \cdot \frac{L(t)}{N(t)}
\]

\[
\hat{C}_N = \hat{C}_Y + \hat{Y}_L + \hat{L}_N
\]

\[
\hat{C}_Y = (\hat{C}_N - \hat{Y}_L) - \hat{L}_N
\]

first demographic dividend

second demographic dividend
3. Results
Four alternative measures of the support ratio (relative to 2000); European NTA countries

- Germany
- France
- Slovenia
- UK
First demographic dividend
Years, in which the first demographic dividend was positive

<table>
<thead>
<tr>
<th>Year</th>
<th>Austria</th>
<th>Finland</th>
<th>France</th>
<th>Germany</th>
<th>Hungary</th>
<th>Slovenia</th>
<th>Spain</th>
<th>Sweden</th>
<th>UK</th>
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<td>2010</td>
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<td>2020</td>
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<td>2030</td>
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<td>2050</td>
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</tbody>
</table>
Components of consumption per capita

\[
\frac{C(t)}{N(t)} = \frac{C(t)}{Y(t)} \cdot \frac{Y(t)}{L(t)} \cdot \frac{L(t)}{N(t)}
\]
Cumulative effect of the first (negative values) and second (positive values or zero) demographic dividend on economic growth in 2010-2060 period.
Cumulative effect of both demographic dividends combined on economic growth in 2010-2060 period
4. Conclusion
• Age specific economic activities instead of age limits

• NTA support ratio predicts a greater decline as conventional support ratio (SR)

• Germany and Slovenia are the countries with the strongest drop in the SR

• The first demographic dividend is negative for the next five decades

• The cumulative effect of the FDD is in the range of -11% (UK) and -28% (Slovenia)

• A second demographic dividend is projected only for UK, Germany and Spain.

BUT

So far only cross-section age profiles!
Ergebnisse für Österreich (2005)
Das Lebenszyklusdefizit

Altersprofile Arbeitseinkommen und Konsum 2005

Überschuss

Defizit

36 Jahre mit positivem Lebenszyklus-Defizit
23 - 58

Quelle: Hammer und Prskawetz 2011
Öffentliche und Private Konsumausgaben 2005

Öffentliche Konsumausgaben 2005
Gesundheit: 28.2% der Gesamtausgaben
Bildung: 27.5%
Rest: 44.3%

Quelle: Hammer und Prskawetz 2011

Private Konsumausgaben 2005
Gesundheit: 3.4% der Gesamtausgaben
Bildung: 0.8%
Wohnen: 9.6%
Rest: 86.2%

Quelle: Hammer und Prskawetz 2011
Öffentliche Transfers: Ein- und Abgang

![Graph showing public transfers per head, inflow and outflow over age](image-url)
Reallokation von Einkommen, Konsum und Transfers über das Alter
Aggregierte Altersprofile des Einkommens und Konsums

Lebenszyklus-Defizit der Jugend: 18.3%
Lebenszyklus-Defizit der Älteren: 24.1% des gesamten Arbeitseinkommens

Quelle: Hammer und Prskawetz 2011
SUPPORT RATIO

\[ \alpha = \frac{\text{LF}}{\text{CON}} \]

LF .... Arbeitsbevölkerung
CON .... Konsum

Demographischer support ratio:

\[ \text{LF} = \sum_{i=20\ldots64} N_i \]
\[ \text{CON} = \sum_{i=1\ldots99} N_i \]

Ökonomischer support ratio:

\[ \text{LF} = \sum_i w_i \text{PR}_i N_i \]
\[ \text{CON} = \sum_{i=1\ldots99} S_i N_i \]
Entwicklung der ökonomischen und demographischen Support Ratio im Vergleich

Jahr

Ökonomische Support Ratio
Demographische Support Ratio
Erste demographische Dividende

\[ \frac{Y(t)}{N(t)} = \frac{L(t)}{N(t)} \frac{Y(t)}{L(t)} \]

\[ \hat{y} = \hat{L} - \hat{N} + \hat{y}^l \]
Erste demographische Dividende

Periods of positive 1st dem. dividend

- Austria
- Finland
- France
- Germany
- Hungary
- Slovenia
- Spain
- Sweden
3. National Transfer Accounts

The Flow Account Identity

\[ Y^l(a) + Y^a(a) + \tau^+(a) = C(a) + S(a) + \tau^-(a) \]

- **Inflows**
  - \( Y^l(a) \) …labor income
  - \( Y^a(a) \) …asset income
  - \( \tau^+(a) \) …transfers received

- **Outflows**
  - \( C(a) \) …consumption
  - \( S(a) \) …savings
  - \( \tau^-(a) \) …transfers paid

\( C(a) - Y^l(a) = Y^a(a) - S(a) + \tau^+(a) - \tau^-(a) \)

(Source: Mason 2007)
**Components** of...

...consumption: education, health, others  
⇒ private vs. public

...income: asset income, labor income

...transfers: education, healthcare, pensions, illness, unemployment, family and children  
⇒ public vs. private

...assets: businesses, homes, etc.  
⇒ primarily through private institutions

“The mechanisms by which assets are shifted across age groups is important because it determines whether population ageing leads to accumulation of assets or to the expansion of public and private transfer programs.”

(Mason and Lee 2006)
Life cycle deficit

Consumption and labor income, Austria 2005.

Surplus

Deficit

23  36 years  58

Source: Hammer and Prskawetz (2011)
public consumption, Austria 2005

Source: Hammer and Prskawetz (2011)

private consumption, Austria 2005

Source: Hammer and Prskawetz (2011)
age-reallocation in Austria, 2005

Source: Hammer and Prskawetz (2011)
We cannot continue with the status quo!

Source: Hammer and Prskawetz (2011)
e) The First and second demographic dividend - continued

Age span in which LCD is negative; the share of private transfers in total transfers to children and the share of asset based reallocation in financing the consumption of elderly

<table>
<thead>
<tr>
<th>Country</th>
<th>Age span in which LCD is negative</th>
<th>Children $t_k$</th>
<th>Elderly $t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland (2004)</td>
<td>26-59</td>
<td>44</td>
<td>11</td>
</tr>
<tr>
<td>Germany (2003)</td>
<td>27-57</td>
<td>63</td>
<td>46</td>
</tr>
<tr>
<td>Hungary (2005)</td>
<td>25-58</td>
<td>49</td>
<td>0</td>
</tr>
<tr>
<td>Spain (2000)</td>
<td>26-58</td>
<td>69</td>
<td>51</td>
</tr>
<tr>
<td>Austria (2000)</td>
<td>21-56</td>
<td>57</td>
<td>14</td>
</tr>
<tr>
<td>UK (2007)</td>
<td>24-56</td>
<td>72</td>
<td>69</td>
</tr>
</tbody>
</table>

\[ W(t) = A(t) + T_k(t) + T_P(t) \]